

Additional Information

Attached for your information is a paper which Mr. Hays presented on March 27 at the 2002 Environmental Information Association's Annual Conference in Austin, Texas.



Mold Investigations for Insurance Claims in South Texas

Presented for:

EIA 2002

**Improving Our Living Environment:
Building Solutions**

Presented by:

Steve M. Hays, CIH

Gobbell Hays Partners, Inc.

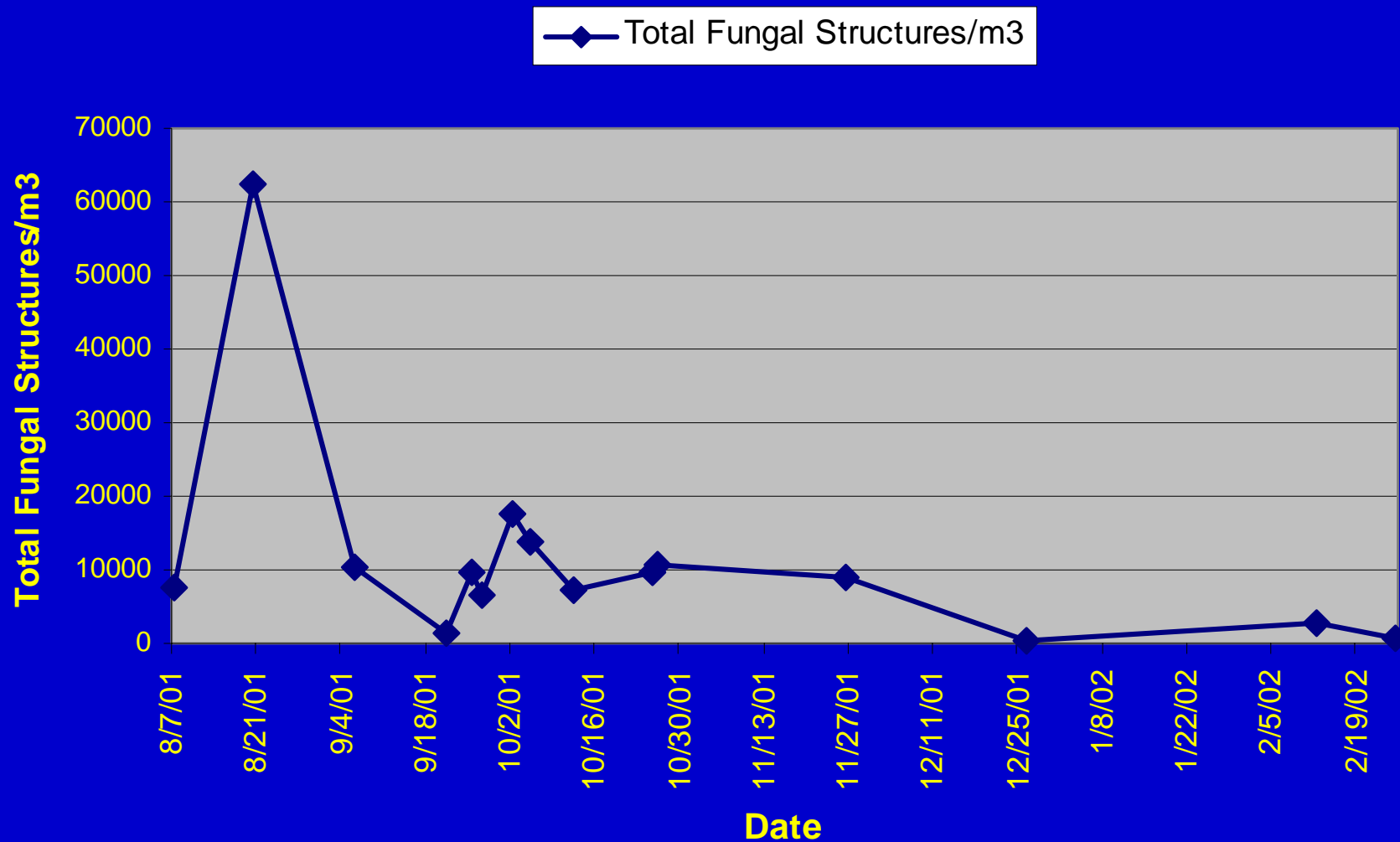
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March 27, 2002



Nonviable Outside Results

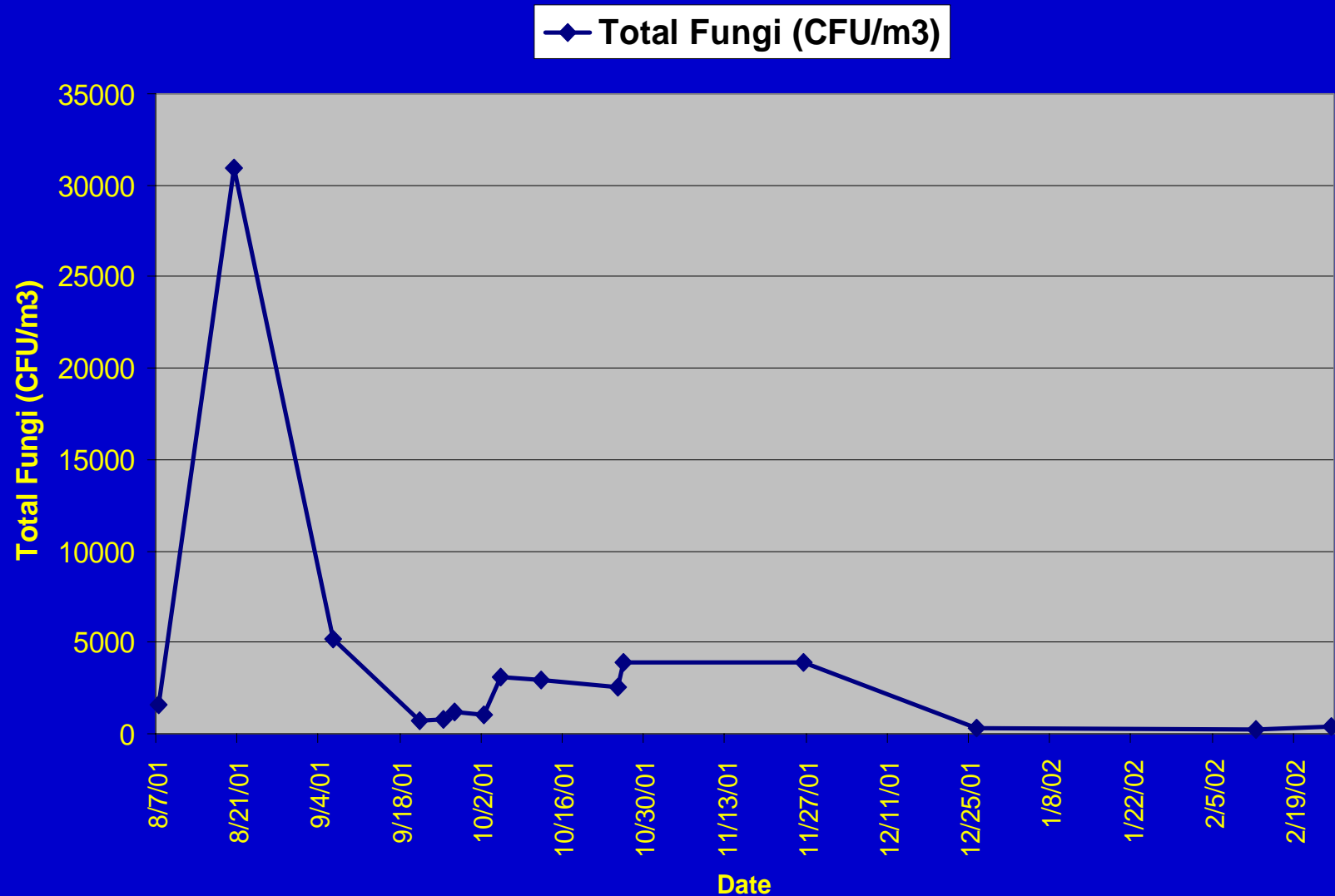


Nonviable Outside Air (Total Fungal Structures/m³)

- **Mean = 11,315**
- **Standard Deviation = 14,465**



Viable Outside Results

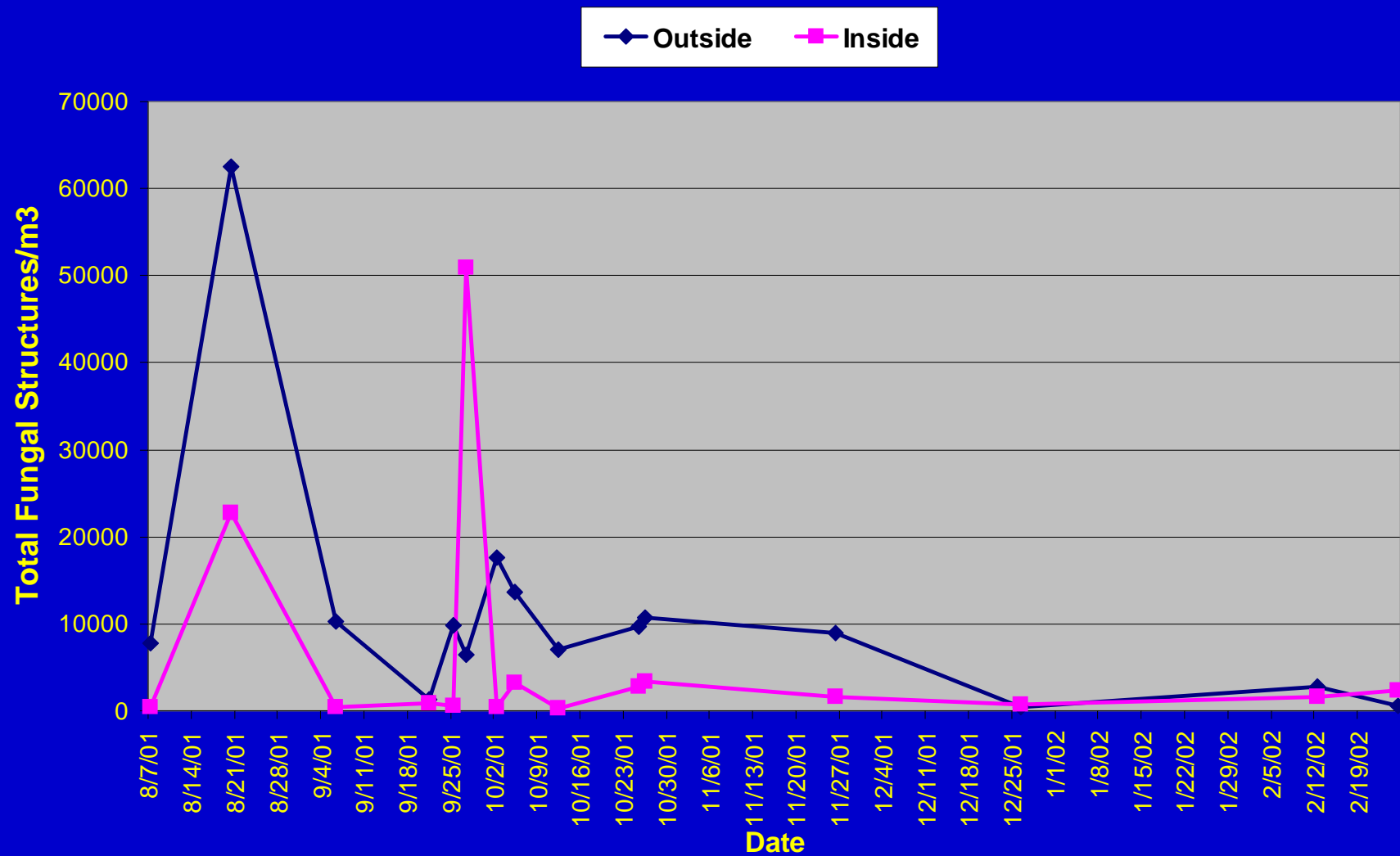


Viable Outside Air (Total Fungi in CFU/m³)

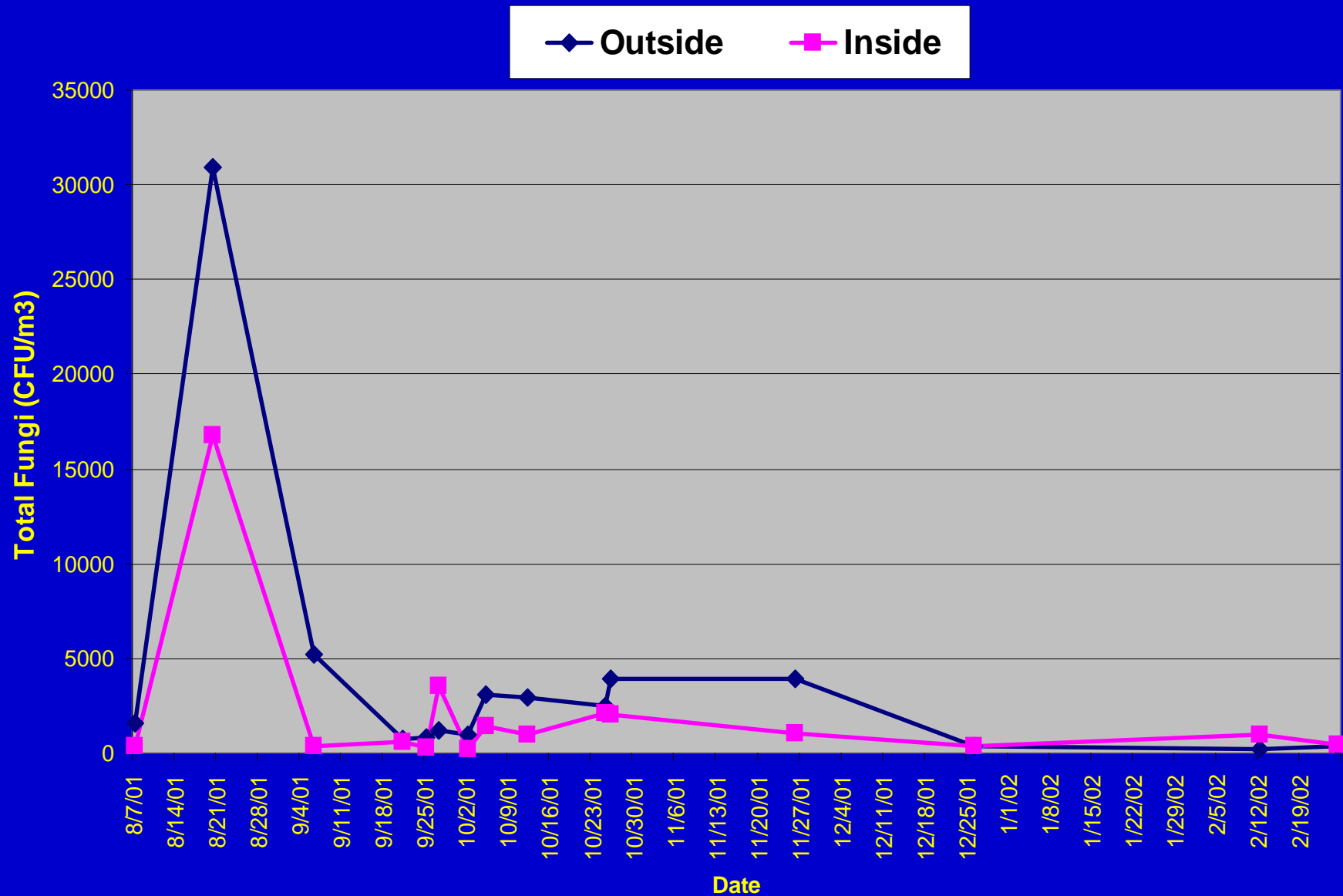
- **Mean = 3,925**
- **Standard Deviation = 7,375**



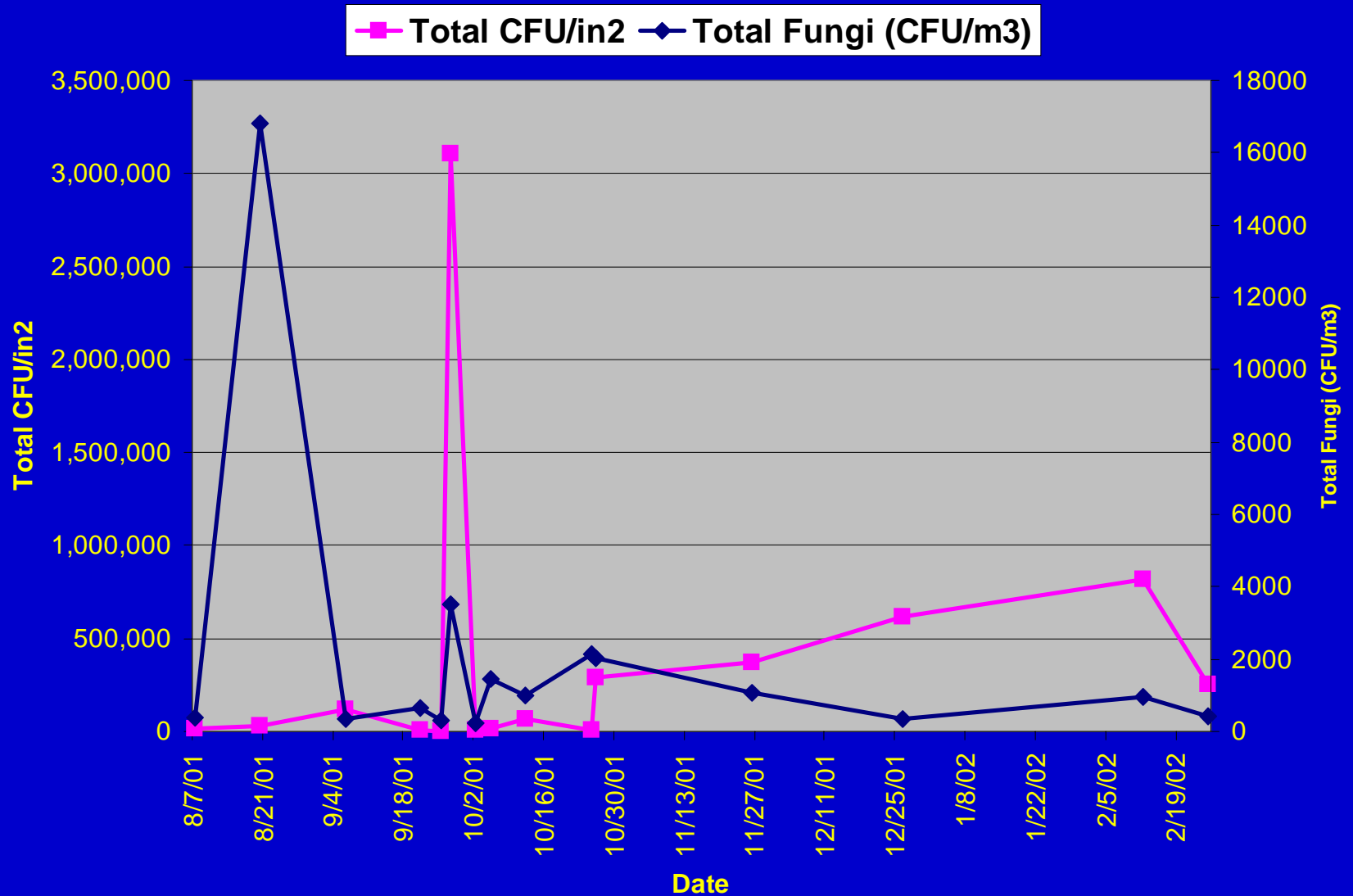
Nonviable Outside/Inside Results



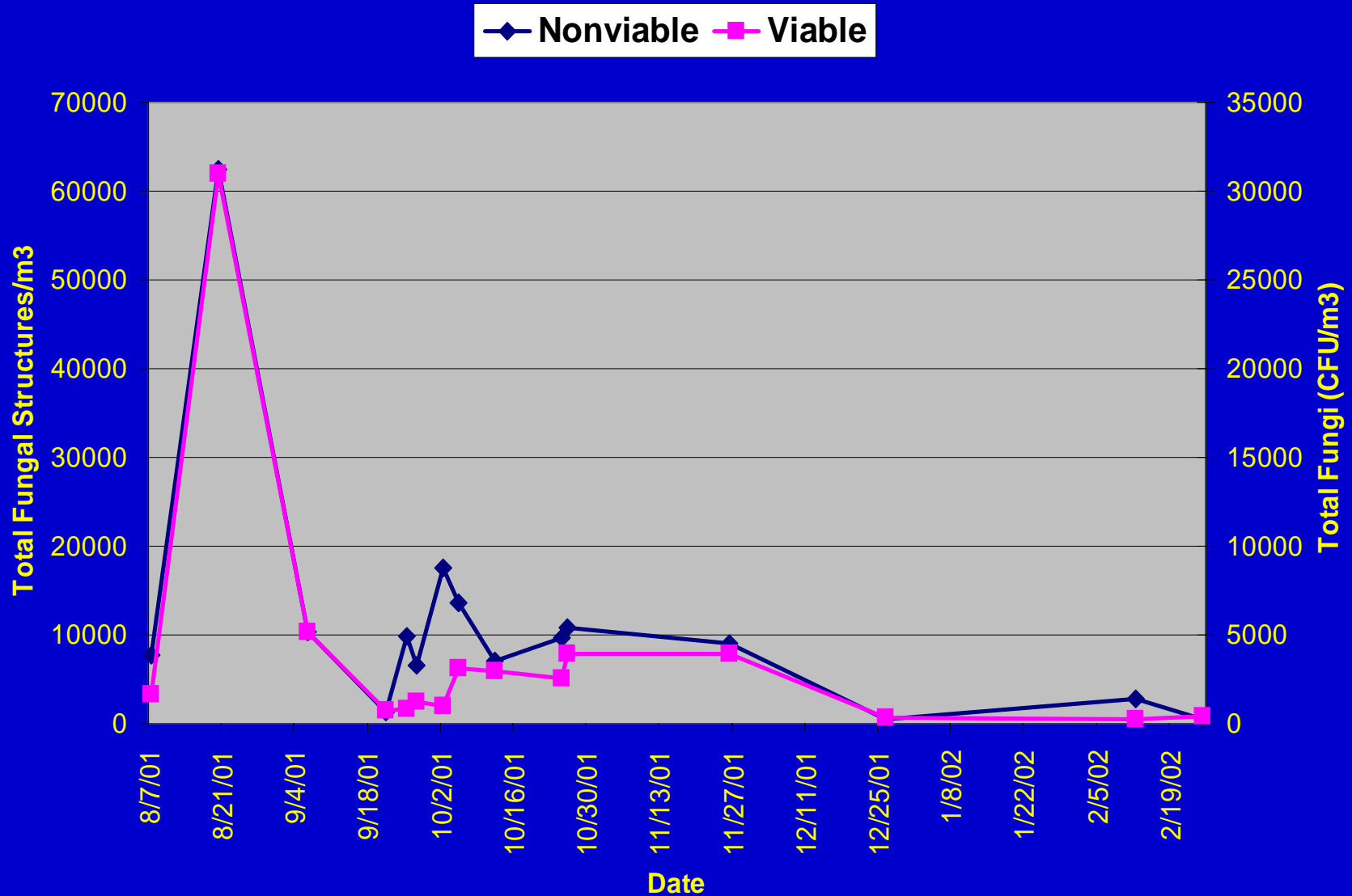
Viable Outside/Inside Results



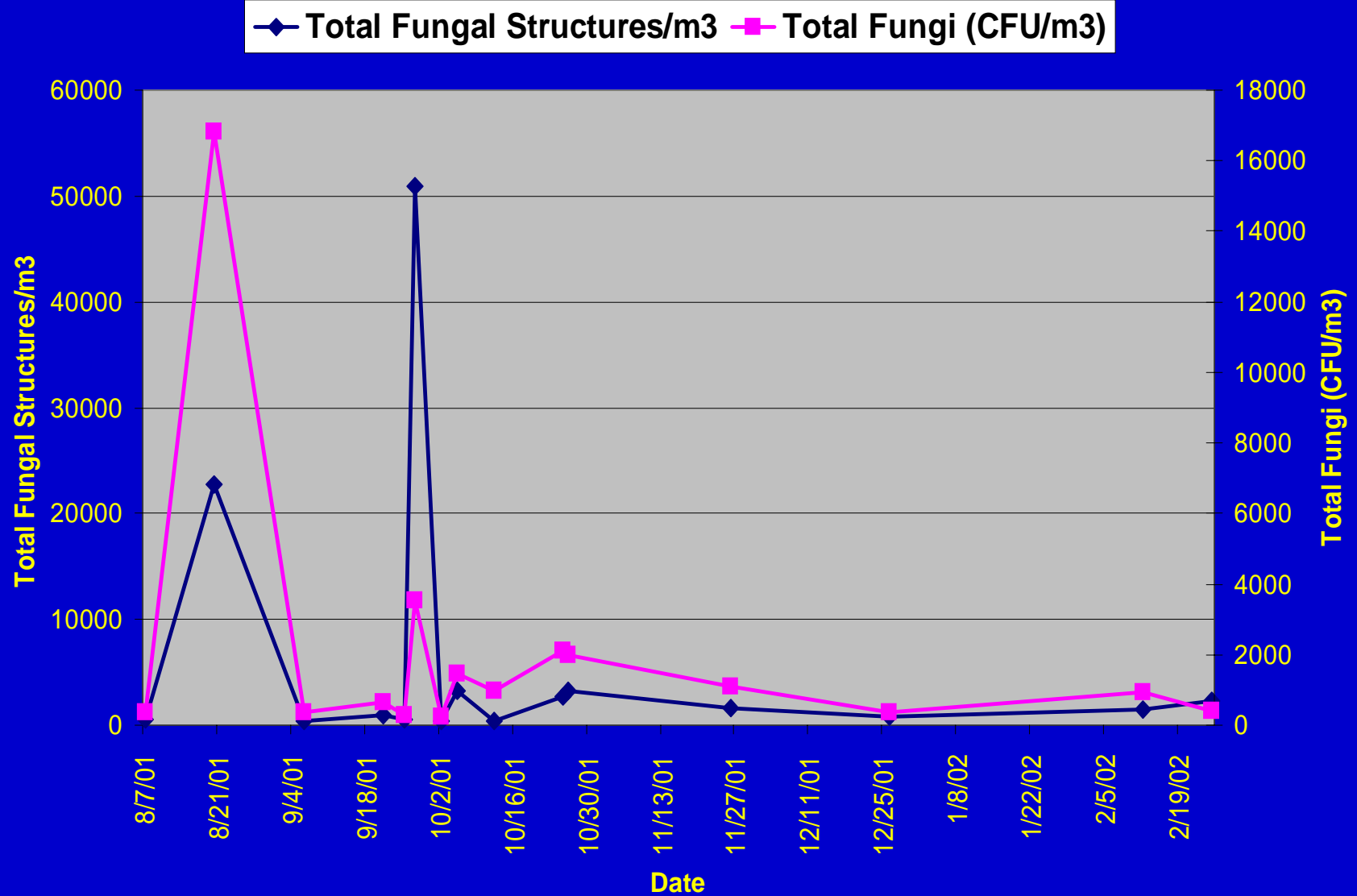
Inside Viable Air vs. Swab Results



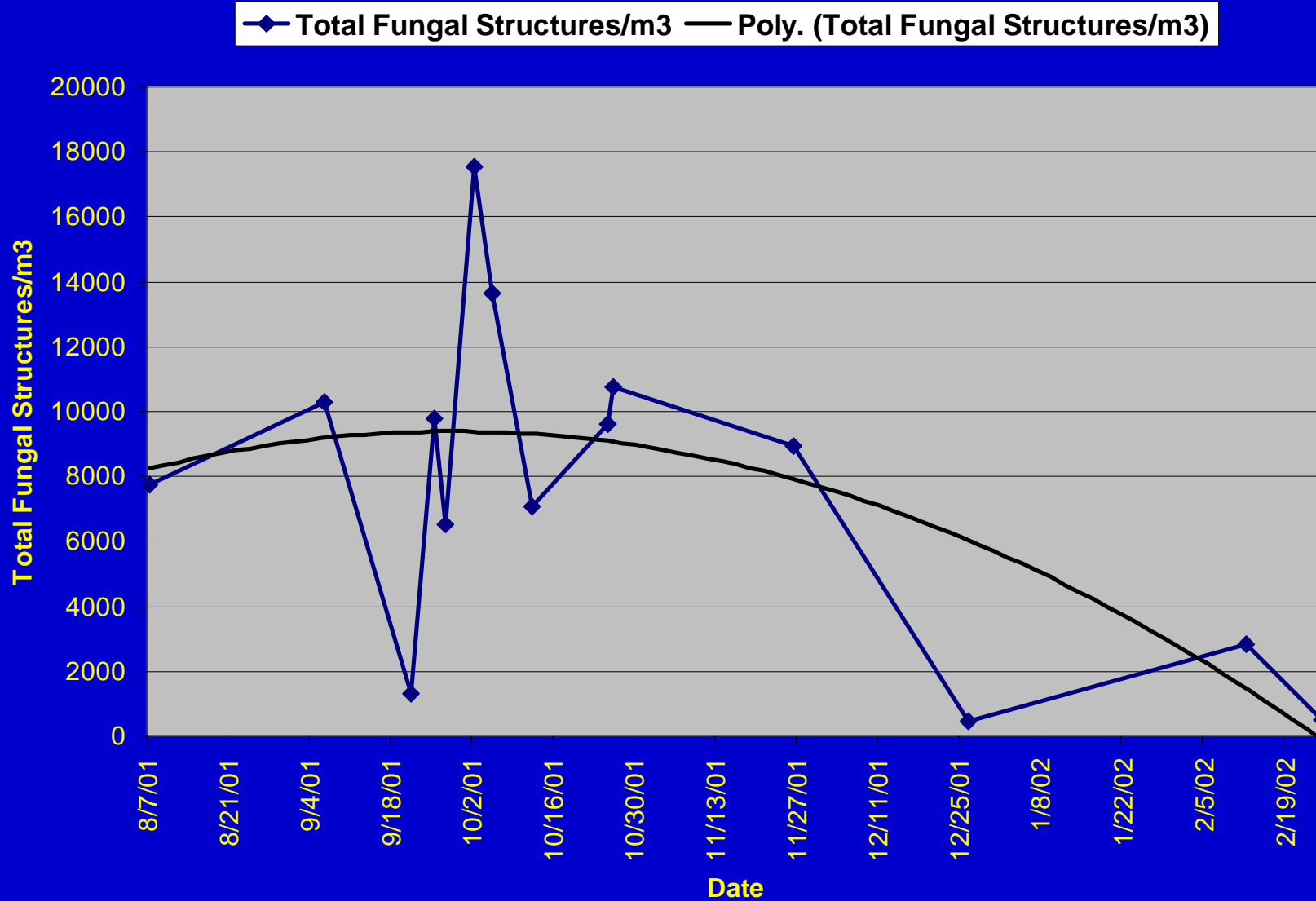
Outside Nonviable and Viable



Inside Nonviable and Viable Results



Nonviable Outside w/o Outlier



Nonviable Outside Air w/o Outlier (Total Fungal Structures/m³)

- **Mean = 7,652**
- **Standard Deviation = 4,841**

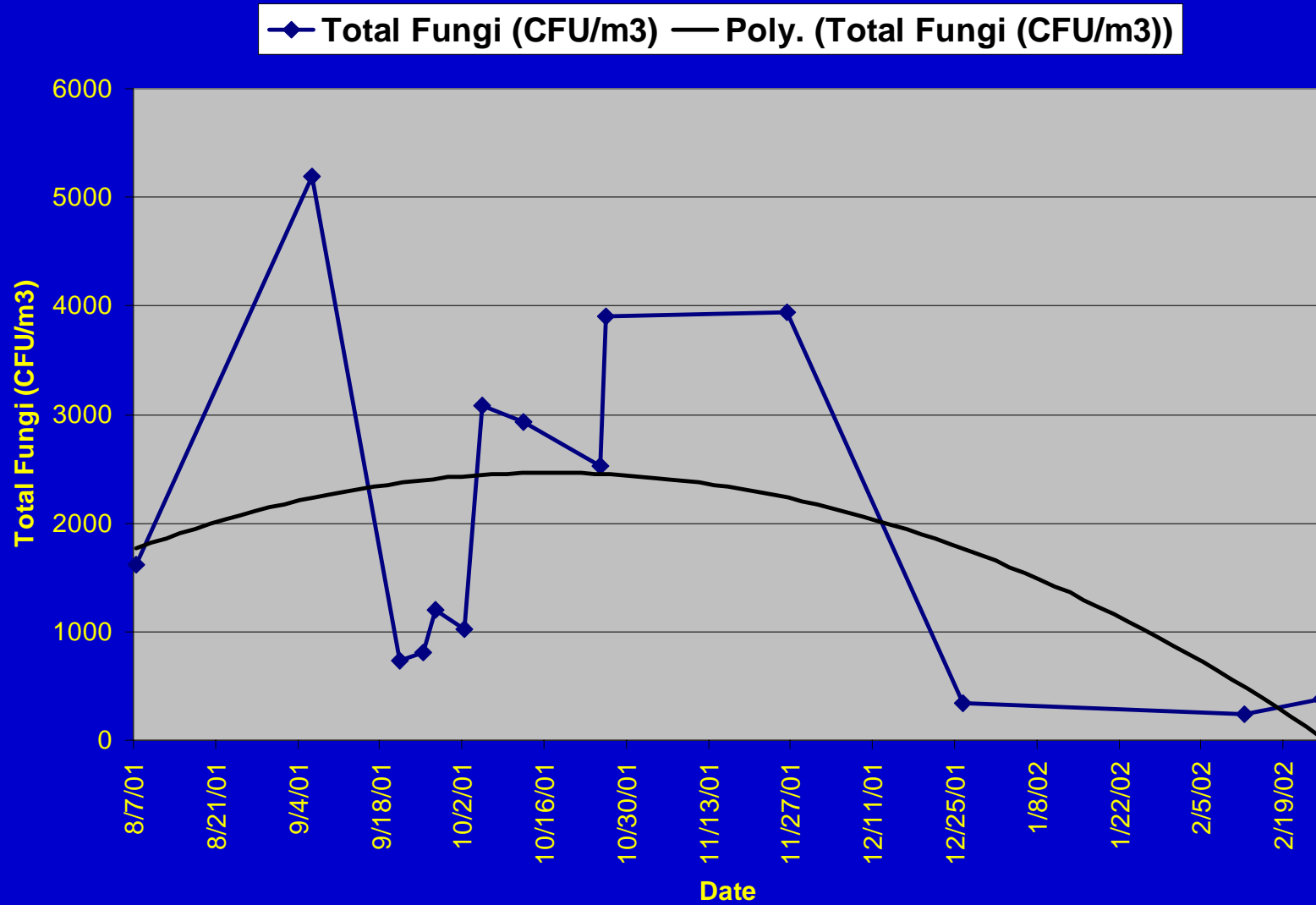


Nonviable Outside Air (Total Fungal Structures/m³)

- **Mean = 11,315**
- **Standard Deviation = 14,465**



Viable Outside w/o Outlier



Viable Outside Air w/o Outlier (Total Fungi in CFU/m³)

- **Mean = 1,995**
- **Standard Deviation = 1,540**

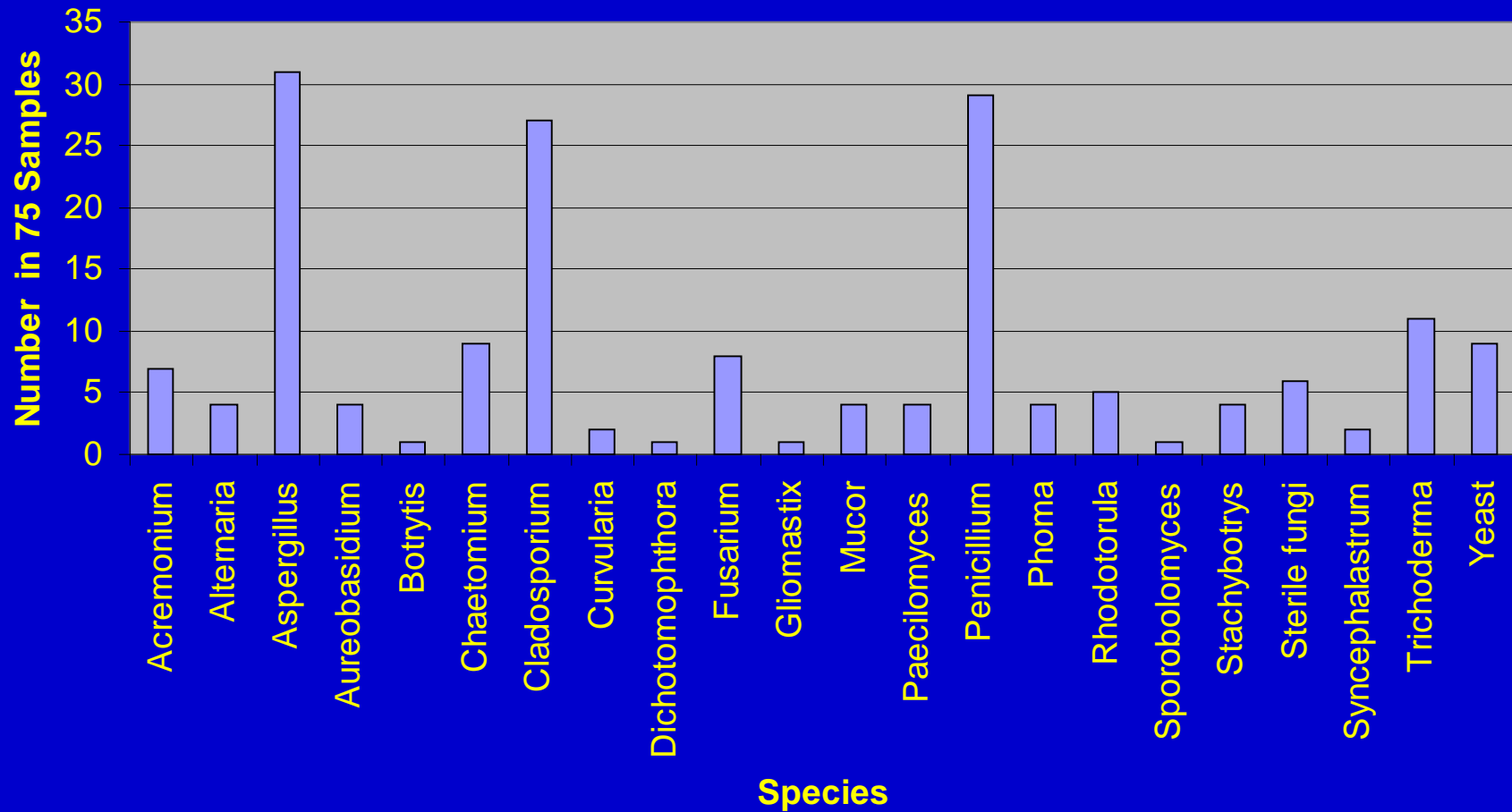


Viable Outside Air (Total Fungi in CFU/m³)

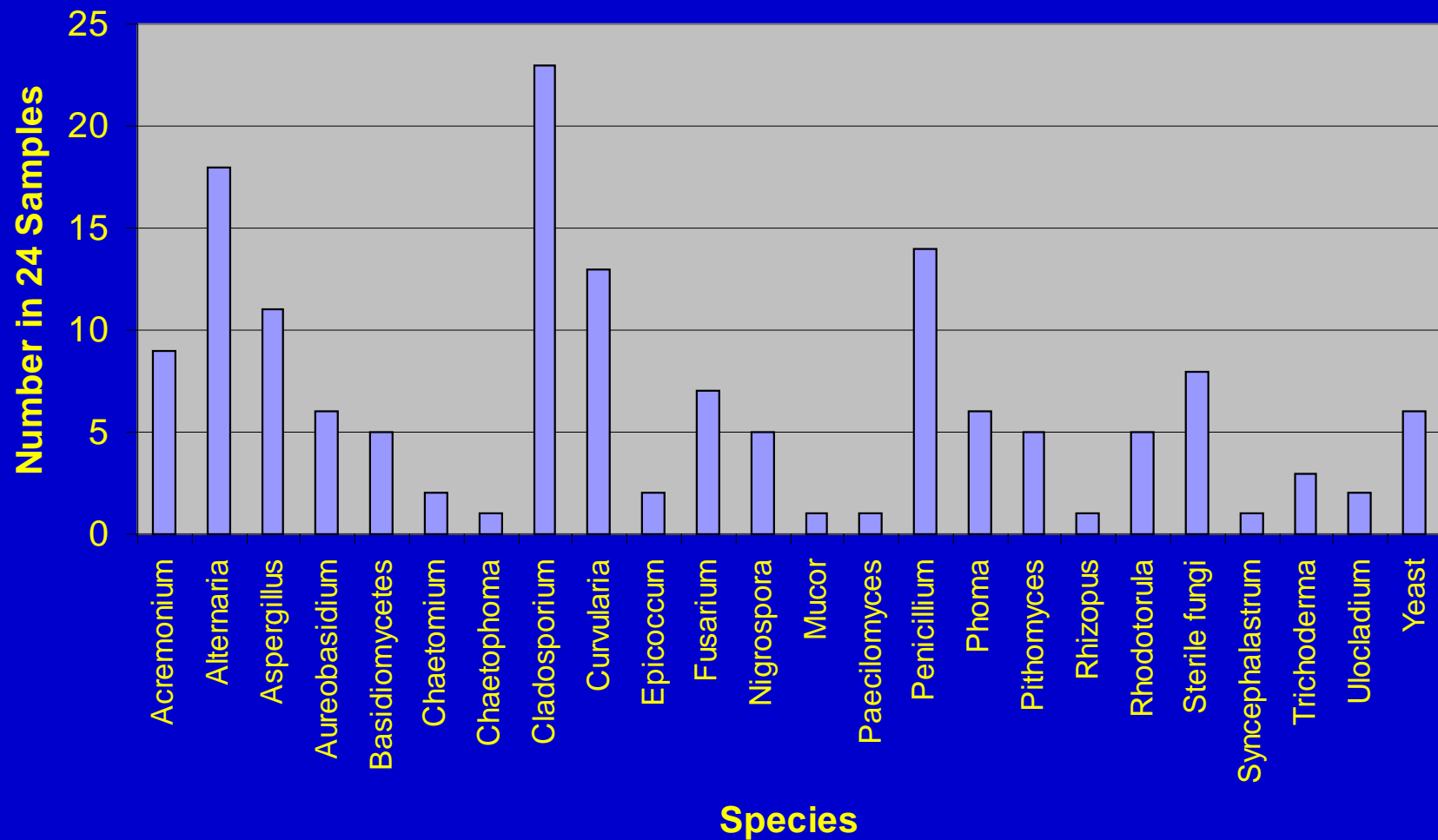
- **Mean = 3,925**
- **Standard Deviation = 7,375**



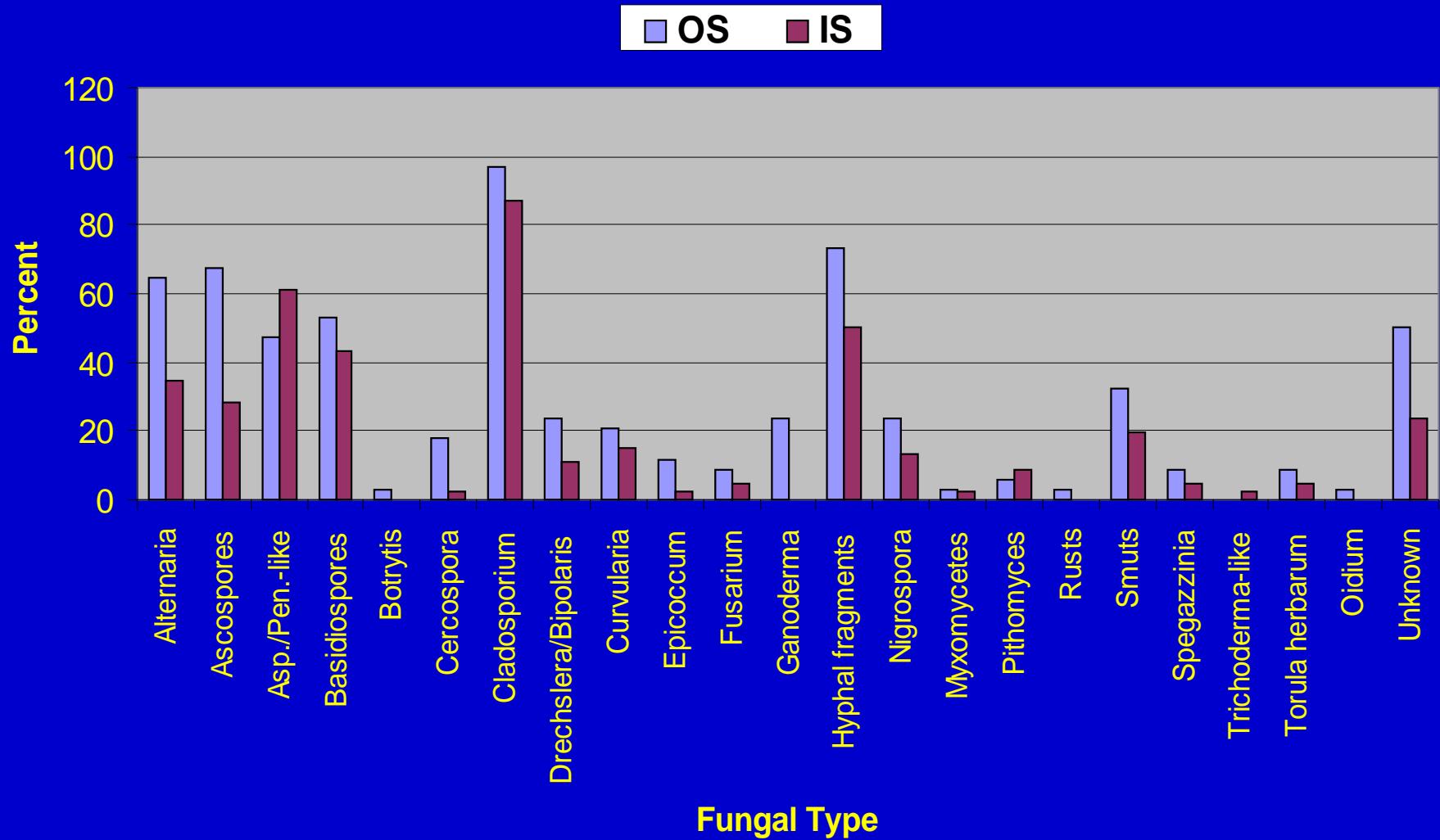
Swab Samples



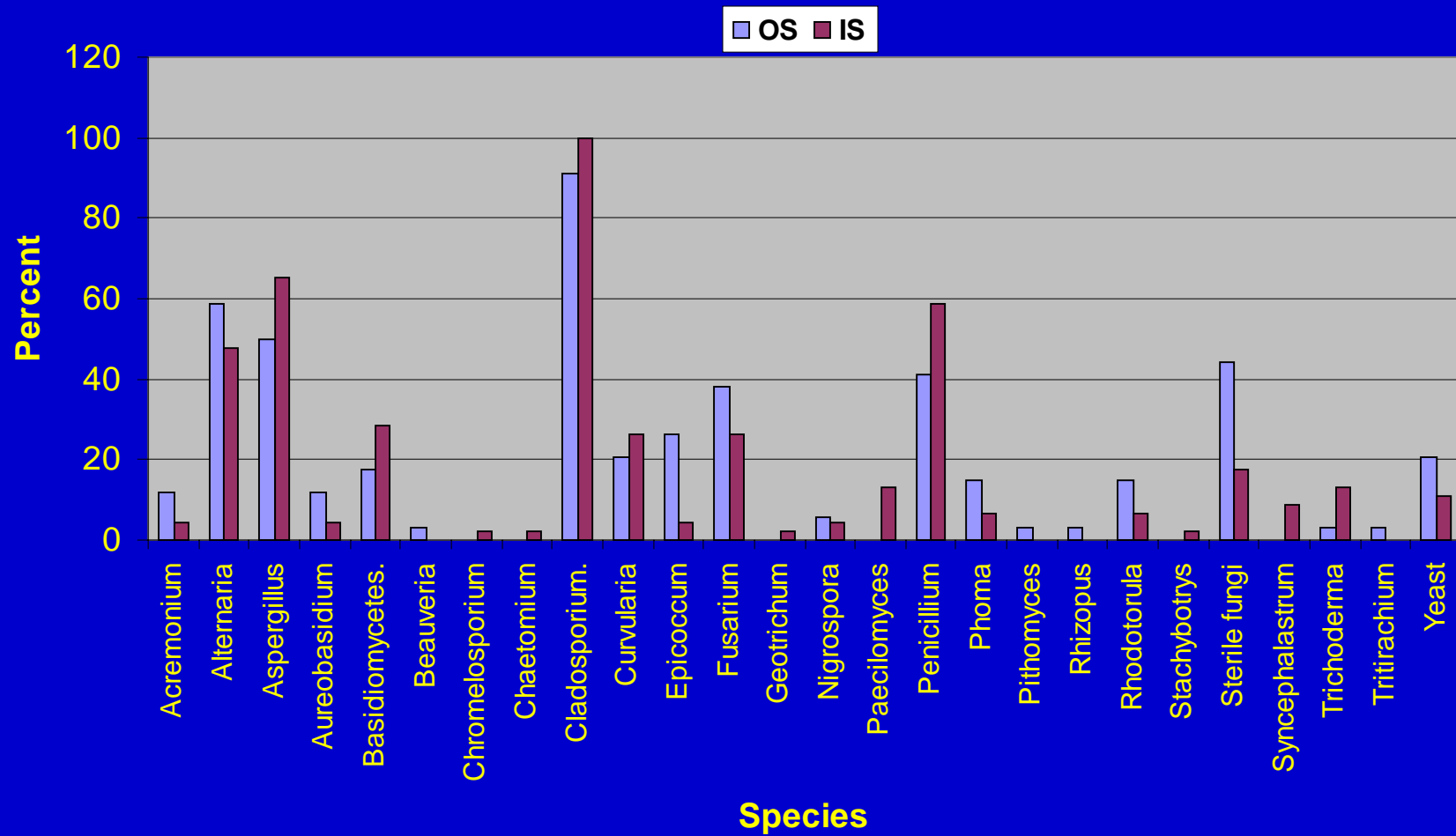
Carpet Dust Samples



Nonviable Air



Viable Air



Most Prevalent Outside Types (Nonviable)

- **Alternaria**
- **Ascospores**
- **Basidiospores**
- **Aspergillus/Penicillium**
- **Cladosporium**



Most Prevalent Outside Species (Viable)

- **Alternaria**
- **Aspergillus niger**
- **Basidiomycetes**
- **Cladosporium**
- **Penicillium**



Most Frequent Moisture Problems

- **Plumbing leaks**
- **Roof leaks (flashing, penetrations damage)**
- **Water overflows (condensate drain pans and toilets)**
- **High humidity (resulting in condensation)**
- **Lack of vapor barrier**



Unusual Moisture Problems

- Exterior siding failure
- Partial or inadequate air conditioning



Inside/Outside Comparison

- **Three (3) of the 15 studies had Total Fungal Structures/m³ greater inside than out.**
- **Four (4) of the 15 studies had Total CFU/m³ greater inside than out.**
- **Three (3) were higher inside than out in both measurements.**



Conclusions

- Viable air sampling is preferred to nonviable.
- Nonviable air sampling major benefit is quicker turnaround.

Clearance?

- The primary seasonal variation outside is with *Cladosporium*, which decreases during the winter.
- The primary genera found in swab samples of visible growth are *Aspergillus* and *Penicillium*.



Conclusions

- Better design and construction of HVAC systems are needed.
- Improved home maintenance and housekeeping are needed.
- Carpets are amplification sources, as well as sinks.
- Carpets impacts interior air samples.

Genera

Species

Concentration

